

CHAPTER 9. ROLE OF THE PHYSICIAN IN SMOKING CESSATION

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Introduction

Although a variety of health care providers have attempted to change the smoking behavior of the groups with whom they work (USDHEW 1979), most of the research in this area, and this review, is confined to patient populations or patient groups who provide opportunities for physician intervention. The nature and extent of the relationship between patient and physician enhances the opportunity for long-term behavior change. Major international studies on utilization of health care reveal that 70 percent or more of North Americans see a physician at least once a year (Kohn and White 1976; National Center for Health Services Research 1983; Pacific Mutual 1978; National Center for Health Statistics 1982). Given this frequency of contact between smokers and their physicians, some 38 million of the 54 million adults in the United States who smoke could be reached annually with a smoking cessation message. Even if only 5 to 10 percent quit on a long-term basis, the potential impact of such contact is enormous. A recent study comparing free medical care to insurance plans requiring shared cost by participants did not show a beneficial impact on smoking (or other health habits associated with coronary heart disease and some types of cancer) from the average of one to two more encounters per year for several years (Brook et al. 1983). The authors comment that "these health habits, especially smoking, were at levels at which substantial health benefit from behavior change was possible" (p. 1432). Thus, physician contact alone does not increase smoking behavior change. Rather, a mix of physician, motivation, educational, and training efforts are doubtless called for.

Many techniques have been described in the literature to assist physicians in treating cigarette smoking in their patients (Allaire 1983; Best 1978; Bohm and Powell 1982; Danaher et al. 1980; Fowler 1983; Hochbaum 1975; Hymowitz 1977; Indyke and Ellis 1980; Luban-Plozza 1977; Pechacek and Grimm 1983; Pechacek and McAlister 1980; Pomerleau 1976; Rose 1975/76; Rosser 1977; Russell 1971; Secker-Walker and Flynn 1983; Sherin 1982; Shipley and Orleans 1982; Windsor et al. 1979). These range from supplying information about smoking and health with advice to quit smoking to implementing complex behavior modification techniques with routine monitoring and long-term followups.

Lichtenstein and Danaher (1978) have described a hypothetical model for the various roles that the physician can perform. According to their formulation, the physician can "(1) act as a model of a healthy lifestyle by not smoking, (2) provide information clarifying the risks associated with smoking and the risk reduction if the patient stops, (3) encourage abstinence by direct advice and suggestions, (4) refer the patient to a smoking cessation program, and (5) prescribe and follow up the use of specific cessation and

maintenance strategies in his or her own office management" (p. 233). This scheme is a hierarchical one, with each role subsuming the behavior of the ones that precede it. Other roles such as political lobbyist and researcher are related only indirectly to patient care (Rosen and Ashley 1978).

In addition to advising their patients to quit, an overwhelming majority of physicians have quit smoking; the prevalence of smoking among physicians has most recently been estimated at 10 percent or less in the United States, considerably below that of the general population (Enstrom 1983; Fletcher and Doll 1969; Garfinkel 1976; USDHEW 1976; Sachs 1983). Physicians are, therefore, carrying out their role as exemplars. In a major national survey, over 90 percent agreed that it was their responsibility to set a good example for patients by not smoking cigarettes (USDHEW 1976). With regard to other roles, the majority of reports (both research and advisory) indicate that physicians usually function as information providers and advice givers. However, evaluations of treatment procedures that can be used for referral or in-depth treatment have also been carried out. It is expected that as results become known and more referral agencies are available, more physicians will be expanding their roles.

The literature on rates at which physicians advise patients to quit smoking shows a disparity between physician estimates and patient reports. Over time, the proportion of physicians recommending cessation has increased dramatically. A mid-1960s survey revealed that 38 percent of physicians claimed that they advised "all" or "almost all" (95 to 100 percent) of their patients who did not have smoking-related disorders to quit or cut down (Green and Horn 1968). Eighty-eight percent of physicians claimed they gave this advice to patients with lung and pulmonary conditions. In 1979, 85 to 92 percent of physicians participating in the evaluation of a quit smoking kit said they had spoken to smoking patients in the past few weeks, advising quitting to 6 to 7 out of the last 10 smoking patients seen (American Cancer Society 1981). In a 1981 survey of primary care practitioners in Massachusetts, 90 percent of all physicians who responded said they routinely asked about smoking; however, only 58 percent felt "very prepared" to counsel patients, and a mere 3 percent felt they were currently "very successful" in helping patients to change their smoking behavior (Wechsler et al. 1983). Ninety-eight percent of a Canadian sample of primary care physicians surveyed in late 1981-1982 reported advising patients who smoke to stop, with 45 percent claiming some success (Battista 1983; Battista and Spitzer 1983). There is evidence that smoking physicians feel less comfortable in dispensing advice to quit smoking and, therefore, do it less forcefully (American Cancer Society 1981).

The majority of persons who smoke feel that physician advice to quit or cut down on smoking would be influential (American Cancer Society 1977; Pacific Mutual 1978). In a 1978 survey of the public, doctor's advice was perceived to be the most effective means of prompting cessation or reduction among six alternatives considered, the other five being prohibition of smoking at work and in public places; urging by children, spouse, or relatives; higher taxes on tobacco; antismoking informational campaigns at work; and anti-smoking advertising on television (Pacific Mutual 1978). In this survey, 76 percent of smokers reported that doctor's advice would be "very" or "somewhat" effective in this regard. Given this general level of enthusiasm and confidence in physician-delivered messages, actual rates of reported advice are quite low. In the survey just reported, only 8 percent of former smokers spontaneously mentioned a doctor's recommendation as a cause of their cessation, although 51 percent cited health reasons (Pacific Mutual 1978). In the 1975 Adult Use of Tobacco survey, a full 64.6 percent of male and 60.8 percent of female current smokers claimed they had never received advice from any doctor about quitting, cutting down, or continuing smoking (USPHS 1976). About 20 percent of current smokers had been advised to quit. Combining advice to quit or cut down, the percentage rose to approximately 35 percent. A somewhat lower estimate of physician advice was obtained from a nationwide study of approximately 8,000 people (Stewart et al. 1979). Advice to quit or cut down was reported by 22.4 percent, and lack of advice by 77.6 percent. However, patient recall for the details of a physician visit may be flawed. In one study, almost complete recall of cessation advice was reported 1 year later (Mausner 1970), but in a second study only 50 percent of patients recalled cessation advice 2 months after it was given (Rose and Udechuku 1971).

It seems quite likely that physicians do offer varying degrees of advice and guidance to their patients (Fowler and Jamrozik 1983; Wechsler et al. 1983), and in view of the decrease in social acceptability given to the smoker, more physicians will be spending more of their time and energy in this way in the future. A growing number of editorials in medical journals have been devoted to the importance of primary prevention and to motivating physicians to this task (Check 1979; Yankauer 1983).

This chapter reviews and summarizes studies of smoking cessation in various groups of patients, with a special focus on physician intervention. Four classes of patients are considered: general practice, obstetric, pulmonary disease, and cardiovascular disease. Reviews of this literature show a positive relationship between severity of disease and the likelihood of quitting smoking (USDHEW 1979, 1980; Lichtenstein and Danaher 1978; Pederson 1982). However, Pederson cautions that a causal interpretation of this relationship

may not be warranted, as physician involvement may be greater and the effect of physician advice more salient or intense with sicker patients. In addition, a section on research using nicotine chewing gum as a treatment is included. Suggestions regarding future research and treatment are also presented.

Patient Groups

General Practice Patients

Unlike the physician whose practice involves mainly patients with pulmonary or cardiac disease, a large proportion of the general practitioner's time may be spent in lifestyle modification of a preventive nature with patients who are not experiencing smoking-related problems. It may be that compliance among these patients is dependent upon diagnosis, but no available studies have related the reason for the office visit to success or failure in quitting, although most counseling is said to take place during regular checkups or during visits for respiratory problems, much less often than during visits for unrelated major medical problems or minor problems (Battista 1983).

Nine studies have dealt specifically with general practice patients. Mausner et al. (1968) followed 157 smoking patients of two physicians sharing an office. One physician advised all the smokers in his practice who came to his office over a 2-month period to quit ($n=121$). Patients were told that smoking was harmful, and were given written information on quitting techniques as well as lobeline, a nicotine substitute. The other physician made no special mention of smoking ($n=36$ patients). At a 6-month followup, 33 percent of those who were told to quit had reduced the amount they smoked, compared with 9 percent in the group without such cessation advice. Reduction was defined as a decrease of at least 10 cigarettes per day. There was no validation of self-report. The factors found to be related to decrement in smoking were higher initial consumption and number of pack-years; a marginally significant relationship with being male was noted, and for both sexes it was the heavier smokers who changed.

Porter and McCullough (1972) compared the smoking behavior of 101 randomly selected patients who were counseled by one general practitioner about their smoking with 90 patients who were not counseled. Counseling consisted of advice, discussion, and a leaflet. There was no significant difference in quit rate after 6 months between the two groups: 2.5 percent in the counseled group and 4.4 percent in the not counseled group quit. No validation was performed.

Handel (1973) followed for 1 year a group of 100 patients whom she had advised in 1- to 7-minute messages to quit smoking. The advice

was followed by 38 percent of the men and 11 percent of the women. Eighteen percent of the remaining male smokers and 22 percent of the female smokers reported reducing consumption by more than 50 percent. No control group was included in this study.

Pincherle and Wright (1970) reported a smoking intervention in a clinic that provided health examinations of business executives on an annual or biannual basis. Physicians were encouraged to deliver a strong antismoking message, and a booklet was made available. Results varied among the 10 participating physicians; between 17 and 35 percent of the 1,493 smokers seen at a followup visit at approximately 18 months had stopped smoking cigarettes or had reduced their smoking more than 30 percent. There were no controls or validation of self-report. The doctor's own past or present smoking habits only partially accounted for the variation in success rates (cf. American Cancer Society 1981). The quit rate of 19 percent reported by Richmond (1977) in a similar setting is consistent with their findings. In preliminary findings, Rosser (1979) reported that 10 percent of smokers counseled by family physicians about cardiovascular risk reduction report smoking cessation 1 or 2 years later.

In a large-scale study of 2,138 patients of 28 London physicians in five practices, Russell et al. (1979) assessed the effectiveness of physician smoking advice in comparison with no advice. Assignment to group was by day of attendance at practice. Four groups were used: a nonintervention control, a questionnaire-only control, an advice-only group, and an advice group receiving a two-page pamphlet and a warning of subsequent followup. Advice was delivered in the physician's own style in a 1- or 2-minute message. At 1-year followup, the overall quit rate was 14.4 percent—respectively for each group, 10.3, 14.0, 16.7, and 19.1 percent. The percentages of patients who stopped within 1 month of the initial visit and who were still abstinent at followup were 0.3, 1.6, 3.3, and 5.1 percent, respectively. These results were statistically significant, indicating that advice to quit was effective and enhanced by written material and information about a subsequent followup. The major effect was to increase motivation in terms of the percentage of patients in each group attempting to quit but not the success rate of quit attempts, and to reduce relapse at the 1-year point compared with the initial 1-month assessment. One can interpret this as due to the limited scope of advice, focused on health education, and not to quitting skills. Quit rates differed markedly among physicians and were inversely related to the patient's initial consumption. Validation of the verbal report of abstinence on a very small subsample of patients, using a measure of nicotine concentration in saliva, revealed a low deception rate (7 percent), which may have been unreliable, owing to patient selection methods.

In an attempt to replicate findings of Russell et al. (1979) in a Canadian sample, Stewart and Rosser (1982) randomly assigned 691 patients to one of three groups: control, advice, and advice plus pamphlet. There were no differences between the groups; only 3 to 4 percent of patients had stopped smoking at the 5-month followup and were still abstinent at 1 year. At that later followup, the overall success rate was 11.7 percent; no objective measure of smoking status was included. The researchers note that the control group had a higher rate of long-term quitting (3.1 percent) than in the Russell group's 1979 study (0.3 and 1.6 percent).

A second study by Russell et al. (1983b) enrolled a sample of 1,938 cigarette smokers, aged 16 and older, who visited 34 general practitioners in six group practices in Kent and London in November 1980. All smokers were included and were assigned in balanced design by week of attendance to one of three groups; nonintervention controls, 1 to 2 minutes of advice in the physician's own style plus booklet and warning of followup, and similar advice plus booklet plus offer of a nicotine gum prescription. A questionnaire was mailed and a personal followup was performed after 4 months and 1 year. Patients who did not provide adequate data at both points were counted as smokers. Two-thirds of those who claimed to have quit at each time point were checked by measurement of expired air carbon monoxide. At 1 year, self-reported quit smoking rates in the three groups were 13.4, 10.8, and 16.2 percent ($p < 0.02$), respectively. For those patients not smoking at 4 months and at 1 year, the cessation rates were 6.0, 6.4, and 11.9 percent, respectively ($p < 0.02$). After correction for those who refused or failed chemical validation (22 percent) and for those who switched from cigarettes to pipes or cigars, the cessation rates were 3.9, 4.1, and 8.8 percent ($p < 0.001$). Compared with this group's earlier study (Russell et al. 1979), cessation rates in these nonintervention controls (also see Stewart and Rosser 1982) are much higher (3.9 versus 0.3 percent), but the rates are not directly comparable because the initial followups are not identical (1 month versus 4 months). However, cessation rates in the advice/booklet/warning groups are quite similar (5.1 versus 4.1 percent). Cessation rates in the nicotine gum group are discussed later in this chapter.

Wilson et al. (1982) reported that a simple followup procedure may enhance the effects of physician advice. A group of 211 smokers over 16 years of age attending two middle-class, university-based practices in Hamilton, Ontario, over a 6-month period were recruited. Nonsmokers, pregnant women who smoked, and smokers with communication disorders or terminal illness were excluded. All participating patients received brief (3 to 5 minute) intensive counseling to quit smoking and a pamphlet and, subsequently, were randomly assigned to one of two groups. The 106 smokers in the

treatment group were given followup appointments at 1, 3, and 6 months to review and discuss problems, while the control group of 105 smokers received followup appointments as needed for complaints, but no further smoking cessation counseling. In the treatment group, 23 percent reported cessation at 6 to 14 months, compared with 12 percent of the control condition ($p < 0.05$). When losses at followup were counted as continuing smokers, the success rates dropped to 19.8 and 10.5 percent, respectively. No objective validation was included. Success in quitting was significantly related to several factors: having made previous attempts to quit, judging that it would not be extremely difficult to quit, and smoking regular tar cigarettes (versus low tar).

Pregnant Patients

A number of studies concern smoking cessation and pregnant women, a group of patients who are not experiencing smoking-related disease, but for whom continued smoking has serious implications. It has been documented that smoking during pregnancy, especially in the last trimester, can result in such consequences as reduced birthweight and increased fetal and neonatal mortality (Landesman-Dwyer and Emanuel 1979; USDHHS 1980; USPHS 1973). Some evidence also suggests that lactation in smoking mothers is inhibited and that smoking during pregnancy may be related to childhood hyperkinesis (Denson et al. 1975) and developmental retardation (Landesman-Dwyer and Emanuel 1979). According to Fielding and Yankauer (1978), the pregnant woman has been largely ignored as a target for smoking cessation techniques because evidence concerning the dangers to the fetus is just beginning to emerge. Increasing concern is being expressed for the pregnant smoker (USDHHS 1980), and many smoking cessation strategies have been described to assist women (Gastrin 1983; King and Eiser 1981; Kretzschmar 1980).

The prevalence of smoking during pregnancy and rates of physician advice to quit or cut down have been previously summarized (USDHHS 1980). Almost 60 percent of physicians specializing in obstetrics and gynecology who participated in the 1975 CDC Survey of Physician Advice claimed that they advised most to all of their pregnant patients to quit or to cut down (Danaher 1978). As in the general population estimates of remembered physician advice cited earlier, fewer women report such advice given during pregnancy. About 24 percent of women last pregnant during the 5 years from 1970 to 1975 remembered such advice (Harris 1979).

Rates of cessation among regular smokers during pregnancy ranged from 0.9 to 35 percent, with a median of approximately 20 percent, in the 11 studies summarized in the 1980 Report of the Surgeon General *The Health Consequences of Smoking for Women*

(USDHHS 1980). Results of more recent studies were consistent with the median figure. Hackett (1979) interviewed 57 women at various stages of pregnancy, and 16 percent reported quitting at some time in the prenatal period. Fried et al. (1980) reported a similar quit rate in a group of 67 smokers. The 1980 National Natality Survey (NNS) examined changes in smoking and drinking behavior among 4,405 mothers during pregnancy (NCHSR 1983). Questionnaires were mailed 6 months after delivery to married mothers who delivered live-born infants. Nonmarried mothers were not included in the analysis because of problems with the State government requirement of confidentiality. Mothers were much more likely to stop drinking than to stop smoking during pregnancy. Of those who engaged in the behavior before pregnancy, 30 percent stopped drinking compared with almost 18 percent who stopped smoking. White mothers had the highest smoking rates before pregnancy (32.0 percent) when compared with blacks (24.8 percent), Hispanics (23.3 percent), and others (19.9 percent). No significant differences by age, race, or Hispanic origin were found in the proportion who stopped smoking, although blacks appeared to have slightly lower quit rates (13 percent) than either whites (18 percent), Hispanic (25 percent), or other mothers (21 percent). Educational attainment, however, was directly related to the tendency to stop smoking. Of white mothers who smoked, the proportion who stopped during pregnancy ranged from 10 percent for mothers with the least education (did not graduate from high school) to 24 percent of mothers with the most education (16 or more years education).

Three studies have combined observations of smoking discontinuance in pregnancy with some interventional tactic. Baric et al. (1976) found that their entire sample of 134 pregnant British women thought smoking could be harmful to the fetus, but only 16 percent received this information from a doctor; most had received it from the media. A total of 24 patients (18 percent of the sample) quit smoking on their own; 63 of the remaining women participated in an intervention program involving exposure to educational material by a "doctor," and 47 served as controls. Subsequent analysis revealed that while the groups did not differ significantly in the number of women who quit smoking 11 weeks following treatment (14 percent), significantly more in the intervention group modified their consumption.

Dalton et al. (1981) surveyed smoking behavior (using self-report only) in 282 pregnant British women, of whom 49 percent smoked at the beginning of pregnancy. Thirty-two percent of the smokers in the sample claimed they were given no medical advice to quit smoking. Ten percent reported quitting smoking during pregnancy. A local and a national poster and leaflet campaign designed to increase smoking cessation rates at a prenatal clinic had no effect. The advice

to curtail smoking was given in a minimal fashion, and rarely by general practitioners. Knowledge of the hazards of smoking was higher among those who acknowledged receiving advice than among those not acknowledging advice. Also, those who quit were better informed about fetal hazards than those who continued to smoke.

Using a breath test for carbon monoxide to validate self-report, smoking status was assessed in 179 pregnant women of moderate to low socioeconomic status in Pittsburgh (Hughes et al. 1982). Most women (61 percent) were in the third trimester of pregnancy. At the beginning of pregnancy, 55 percent of the women reported smoking; of these, 19 percent reported that they had quit and 37 percent reported that they had reduced their smoking rate during pregnancy. The rate of false positive results among self-reported nonsmokers was 12 percent, and the rate of false negative results among self-reported smokers was 12.5 percent. Both continuing smokers who reduced consumption and quitters made those changes in the first trimester, and gave pregnancy-related reasons for changing their smoking behavior. However, none of the pregnancy-related factors examined were statistically associated with quitting or cutting down. Most of the continuing smokers expressed a desire to quit or to cut down and wished to receive treatment, but only 1 woman (of 80) attended a free cessation program nearby. The authors note that interventions scheduled early in pregnancy during prenatal outpatient visits would be optimal for such a group.

A fourth test of an intervention designed for pregnant smokers was reported by Danaher et al. (1978). Eleven women participated in a 6-week program delivered by behavioral scientists that included instruction in behavior modification, deep muscle relaxation, and educational information. Of the eight women who completed the program, four quit smoking and another three markedly reduced consumption. At a 9-month followup, three women were completely abstinent, and one woman was smoking less than one cigarette daily. No control group was included in this study, so it is not possible to evaluate the relative effectiveness of the treatment package.

Finally, three randomized trials of smoking cessation interventions with pregnant women have been reported. Donovan (1977) and co-workers (Donovan et al. 1975) randomly assigned 588 pregnant British women to a control or an intervention group receiving intensive antismoking information. Unfortunately, the number of patients achieving abstinence at least for the duration of their pregnancies was not reported. There was a significantly larger reduction in amount smoked by the intervention group than by controls, however. Almost one-third of a group of women who voluntarily quit resumed smoking before the end of pregnancy, a finding not replicated in U.S. women by Sexton and Hebel (1984).

Bauman et al. (1983) reasoned that exposure to alveolar carbon monoxide (CO) levels in pregnancy would provide a concrete demonstration of a current and personal consequence of smoking. All pregnant women attending a public prenatal clinic over a 6-month period were randomized to experimental and control groups; 47 percent of the 170 women were smokers. Experimental subjects, both smokers and nonsmokers, observed their CO levels in a group setting. Control subjects did not have the CO intervention. All subjects were read a script on smoking, CO, and adverse effects of smoking during pregnancy; health educators implemented all procedures. In the experimental group, there were 36 women smokers exposed to their own CO; the control group contained 43 smokers. Six weeks after the intervention, there was no difference in quit rates between the two groups (7 percent of experimental subjects and 13 percent of control subjects had quit) or on five other measures of smoking behavior. After adjusting for covariates used in assessing attrition effects and comparison group equivalence, CO levels were significantly lower in the treatment group. The authors concluded that the intervention had either a small or no influence on cigarette smoking.

The first prospective, randomized, controlled clinical trial demonstrating that a reduction of smoking produces a favorable change in infant birthweight contained an effective smoking intervention (Sexton and Hebel 1984). Pregnant women who smoked at least 10 cigarettes per day at the beginning of pregnancy and who had not passed their 18th week of gestation were eligible for entry into the trial. A total of 935 women were recruited from the practices of 52 private obstetricians and a university hospital's obstetric clinic in a large metropolitan area; subjects were randomly assigned to experimental and control groups. Subjects in both groups reported smoking an average of a pack a day at the beginning of pregnancy, but to have reduced their smoking to about 11 cigarettes per day by the time of randomization. The smoking intervention was delivered by health educators, and consisted of encouragement and assistance to stop smoking through informational and behavioral strategies. Each woman received a minimum of one personal visit, supplemented by telephone and mail contacts. The control subjects received no contact until followup. A questionnaire and saliva sample (for thiocyanate analysis) were obtained at randomization and during the followup in the eighth month of pregnancy. At followup, 43 percent of women in the treatment group and 20 percent of women in the control group reported quitting smoking. Overall, there was a significantly greater reduction of smoking in the treatment group; group means for number of cigarettes smoked per day were 6.4 for experimental subjects and 12.8 for control subjects, respectively. Mean thiocyanate levels were significantly lower in the experimental group than in the

control group, verifying self-report on a group level. Cessation results in the control group, contrary to the findings of Donovan (1977), showed that very few women who quit smoking in the first trimester resumed smoking during the pregnancy; also, very few who had not quit in the first trimester quit on their own later in the pregnancy. This study clearly demonstrated that an "antismoking intervention is feasible to conduct, accepted by pregnant women, and effective in producing a reduction in smoking, and most important of all, that cessation even during pregnancy improves the birthweight of the baby" (Sexton and Hebel 1984, p. 915). These are important results, obtained in a relatively high risk study group, and deserve to be followed up.

Patients With Pulmonary Disease

A large proportion of the patients seen by a pulmonary specialist are experiencing, firsthand, the health problems resulting from continued smoking (Pederson 1982; Windsor et al. 1979). The literature cited below demonstrates that the presence of serious illness adds credence to the physician's message and is related to increased compliance (Cooperstock and Thom 1982; Daughton et al. 1980; Davison and Duffy 1982; Hall et al. 1983; Pederson and Baskerville 1983; Pederson et al. 1982). The evidence continues to accumulate that smoking cessation is followed by favorable changes in cardiopulmonary functioning (Ball and Turner 1974; Buist et al. 1976, 1979; Peterson et al. 1968; Schuman 1971; World Health Organization 1975) and in morbidity and mortality (Hammond 1965, 1966; Kuller et al. 1982; USDHHS 1981; UUSDHEW 1979; Weinblatt et al. 1971; Wilson 1973).

A number of studies (Baker et al. 1970; Burns 1969; Burnum 1974; Dudley et al. 1977; Guzman 1978; Mausner 1970; Peabody 1972; Pederson et al. 1980; Raw 1976; Rose and Hamilton 1978; Rose and Udechuku 1971; Williams 1969) have investigated smoking cessation among patients with respiratory disease. Table 1 summarizes these studies, including data on subject groups, sample sizes, quit rates, and duration of followup.

Eleven studies have investigated quit rates among pulmonary disease patients following physician advice (Baker et al. 1970; Burns 1969; Burnum 1974; Cooperstock and Thom 1982; Daughton et al. 1980; Davison and Duffy 1982; Guzman 1978; Mausner 1970; Peabody 1971; Trahair 1967; Williams 1969). Compliance rates vary from 15 percent to 51 percent, but none of these studies included no-advice control groups as a test of the effectiveness of physician counseling. A trend toward lower quit rates has occurred in the more recent studies.

None of the investigations attempted to identify patient characteristics associated with compliance, although some results suggest that

TABLE 1.—Studies assessing smoking cessation rates among patients with pulmonary disease

Study	Groups	Quit rate (percent)	Duration of followup	Comments ¹
Baker et al. (1970)	Multidimensional treatment, N=134	34	6 months	No control group
Burns (1969)	Private, N=94	47	3 months	No control group; success related to less withdrawal, lower neuroticism, and being male
Burnum (1974)	Private	25	Average, 5 years	No control group
Cooperstock and Thom (1982)	Respiratory, N=33	36	Cross-sectional	Quit rates compared with circulatory and musculoskeletal groups
Daughton et al. (1980)	Hospitalized, N=107	63	Cross-sectional	No control groups, retrospective; ex- smokers and smokers differed in psychosocial factors, pack years
Davison and Duffy (1982)	Lung or cancer, N=52	25	5 years	No control group
Dudley et al. (1977)	Chest clinic Never smokers, N=66 Smokers, N=42 Quitters, N=132	76	Cross-sectional	No control group, retrospective; ex-smokers and smokers differed in psychosocial assets, stability, and expression of depression
Guzman (1978)	Chest clinic, N=123	20	3 to 24 months	No control group
Hall et al. (1983)	Cardiopulmonary Health motivation, N=19 Aversion condition, N=16	10 30	6 months	No significant difference in quit rate; mood states related to reduction; objective verification
Mausner (1970)	Private Eight physicians, N=136	51	3 to 12 months	No control group; ex-smokers and smokers differed in severity of disease

TABLE 1.—Continued

Study	Groups	Quit rate (percent)	Duration of followup	Comments ¹
Peabody (1972)	Not given	25	Not given	Only quit rate reported
Pederson et al. (1980)	Private, N=117	27.4	Retrospective 6 months to 7 years	No control group; multivariate analysis; ex-smokers and smokers differ on diagnosis, age, and sex
Pederson et al. (1982)	Newly diagnosed pulmonary, N=308	12.9	6 months	No control group; multivariate predictive model developed, 92 percent accuracy
Raw (1976)	Motivating advice—"white coat" Motivating advice—"no white coat" Interview—"white coat" Interview—"no white coat," N=10 per group	Overall 12.5	3 months	Results not presented for individual groups
Rose and Hamilton (1978)	Normal case, N=731 Intervention, N=714	14 36	3 years	High risk for cardiorespiratory disease
Rose and Udechuku (1971)	Hospitalized with chronic bronchitis, N=29	25	Not given	No control group
Williams (1969)	Chest clinic, N=204	23	6 months	No control group

¹ Objective validation of self-report of smoking abstinence was performed only in those studies so indicated.

such relationships may exist (Burns 1969; Mausner 1970). Two retrospective studies (Dudley et al. 1977; Pederson et al. 1980) used multivariate techniques to determine the sociodemographic, physiological, and psychological variables that are related to quitting. Dudley et al. (1977) found that "good psychosocial assets, psychological stability, and the ability to express depression openly" (p. 367) discriminated between quitters and nonquitters. Since their measurements were made cross-sectionally, the question remains whether these variables are causes or effects of smoking cessation. In a sample of 117 pulmonary patients, 27 percent of whom quit after physician advice, Pederson et al. (1980) found that abstinence was related to primary diagnosis (those with COLD were more likely to quit), age (older or younger versus middle-aged), and sex (women were more likely to quit) in order of predictive power. These results could have been biased, however, because a number of patients were lost to followup and no objective verification of smoking status was used.

Pederson et al. (1982) conducted a prospective study of 308 newly diagnosed respiratory patients, and using multivariate statistical models, accurately categorized 92 percent of the samples as continuing smokers or quitters, following physician advice. This model was subsequently validated in a second group of similar patients with 89 percent accuracy. In both groups, cessation rates (self-report only) were approximately 15 percent (Pederson and Baskerville 1983). The variables from entry questionnaires useful for discriminating smokers from quitters at followup were prediction of the patient as to smoking status at followup, age, addiction as the major reason for smoking, desire to quit, educational level, socioeconomic status, number of children at home, and being married. Prediction of quitting, increasing age, desire for quitting, socioeconomic status, and being married were positively associated with quitting. Addiction, having children at home, and middle educational level were negatively associated.

Three investigators (Hall et al. 1983; Raw 1976; Rose and Hamilton 1978) tried to vary the type of advice given in order to increase compliance. Raw (1976) found that increasing the motivating information about the risks of smoking and the benefits of cessation by a psychologist subsequent to physician advice to quit did not have a positive effect on compliance, but donning a white coat did. The physician advice itself reduced smoking significantly among advised patients compared with among nonadvised patients. Additionally, the group for whom the psychologist wore the white coat during the interview (motivating or placebo) reduced smoking significantly more than the no-white-coat group did. The dependent variable was the percent reduction in smoking level (number of cigarettes smoked) at 3-month followup by self-report alone. Unfor-

tunately, the sample was small ($n=40$), and abstinence rates were not reported. The author suggests that the white coat is an advisor characteristic that can increase effectiveness of advice.

Hall et al. (1983) found no difference in 6-month abstinence rates between two groups of cardiopulmonary patients ($n=35$) randomly assigned to a health motivation and self-management treatment (26 percent abstinence) or to an aversive smoking treatment (6 percent abstinence), both led by nonphysician health professionals. Results summarizing attrition rate and outcome (post-treatment and at 6-month followup) generally favored the health motivation group, however.

The London Civil Servants Smoking Trial (Rose and Hamilton 1978) was a randomized controlled trial of 1,445 men at high risk for cardiorespiratory disease. Following a screening examination, 714 men were randomized to an intervention group and 731 to a normal care group. For the normal care group, the results of the examination were forwarded to the general practitioner, leaving further action to him. The men were not aware they were in the trial. They were invited to return for the 1-year and 3-year examinations as part of the research. Men in the intervention group were invited by letter to discuss the results of their examination with a physician (all accepted). The 15-minute appointment consisted of strong advice to quit smoking, risk appraisal (oriented to fitness and well-being more than to disease), benefits of cessation, and the practicalities of stopping—choice and personalized motivation. Two booklets were provided, prepared especially for the study. Three further interviews were scheduled at 1-week, 10-week, and 6-month points. All men (intervention and control) who attended the 1-year and 3-year examinations completed a self-administered questionnaire; some were completed by mail. No validation of self-report was made. At the 1-year examination, 51 percent of intervention subjects and 10 percent of control subjects reported cessation of cigarette smoking; excluding those men who had switched to pipes or cigars, rates of tobacco abstinence drop to 38 and 8 percent, respectively. Of all the men who stopped within the first year, 80 percent did so immediately after the first interview. At 3 years, 36 percent of intervention subjects and 14 percent of control subjects were not smoking cigarettes; total tobacco abstinence rates were 23 and 10 percent, respectively. A number of personal characteristics assessed at entry were associated with increased probability of cessation: smoking less than 20 cigarettes per day, not inhaling, use of filter tips, prior attempts to stop, marital status "other than married," professional or executive employment category, and neuroticism (Eysenck Personality Inventory). The level of abstinence achieved in the treatment group is comparable to several other studies with similar

patients (Baker et al. 1970; Burns 1969; Mausner 1970; Pederson et al. 1980) and is closer to the remainder than control group results.

Patients With Cardiac Disease

The studies concerned with smoking cessation among cardiac patients further support the notion that presence of disease may be an important precursor of compliance. The occurrence of a myocardial infarction (MI) is a dramatic event that, in many patients, should add credence to the physician's admonishments. Evidence demonstrates that reduction or cessation of smoking is positively related to survival in MI patients (Hickey et al. 1983; Mulcahy et al. 1975, 1977; Pentecost 1980; Salonen 1980; Sparrow et al. 1978; USDHHS 1983) and is negatively related to a coronary event following uncomplicated angina (Hubert et al. 1982). It appears that smoking cessation decreases mortality among post-MI patients, so that attempts to increase compliance among this group could have life-or-death ramifications.

Table 2 summarizes the studies on this patient group. Successful smoking cessation is relatively high among survivors of MI (Baile et al. 1982; Burnum 1974; Burt et al. 1974; Cooperstock and Thom 1982; Croog and Richards 1977; Halhuber 1978; Hay and Turbott 1970; Kirk et al. 1980; Kornfeld et al. 1982; Lloyd and Cawley 1980; Mallaghan and Pemberton 1977; Mayou et al. 1978; Ronan et al. 1981; Sillett et al. 1978; Weinblatt et al. 1971; Wilhelmsson et al. 1975). Cessation rates range from 22 to 94 percent, with the majority of studies falling in the 40 to 60 percent range. The discrepancies in rates are partially attributable to sample size variations or duration of followup. A trend is apparent, however, with more recent studies reporting lower rates.

In a recent review of the literature on smoking following myocardial infarction, Burling et al. (1984) discuss four major methodological limitations in these studies. First, the definition of abstinence varies among studies, ranging from zero to five cigarettes per day; also, the period over which abstinence is measured, from the MI continuously to followup, should be specified.

Second, self-report of smoking status is rarely verified; a few studies have used biochemical validation (Baile et al. 1982; Burling et al. 1982; Kirk et al. 1980; Ronan et al. 1981; Sillett et al. 1978; Wilcox et al. 1979). Rates of deception have varied from approximately 25 percent of patients claiming abstinence (Sillett et al. 1978; Wilcox et al. 1979) to much lower estimates of discrepancy between self-report and objective measure (Baile et al. 1982; Burling et al. 1982; Kirk et al. 1980; Ronan et al. 1981).

Third, specification of the treatment—the time and amount of antismoking advice delivered—is not always explicit. Advice can be verbal or verbal plus written, and the intensity of the message has

TABLE 2.—Studies assessing smoking cessation rates among patients with cardiac disease

Study	Groups	Quit rate (percent)	Duration of followup	Comments ¹
Baile et al. (1982)	Post-MI	62	Approximately 10 days	In-hospital relapse among patients receiving standard advice, no control group; probability of relapse inversely related to severity of MI; objective validation (breath CO) on a parallel series of patients (unpublished), 9.2% deception rate
Burnum (1974)	Private, N=52	42	Average, 5 years	No control group
Burt et al. (1974)	Post-MI	62	1 to 3 years	
	Strong advice, N=125 Conventional advice, N=85	27.5		
Cooper et al. (1982)	High risk, N=519	24	2 years	No control group
Cooperstock and Thom (1982)	Patients with circulatory problems, N=377	73	Cross-sectional	Quit rates compared with respiratory and musculoskeletal groups
Croog et al. (1977)	Post-MI, N=205	51	8 or 9 years	No control group; no differences between ex-smokers and smokers for health beliefs or sociodemographic characteristics
Hay and Turbott (1970)	Post-MI, N=137 Coronary insufficiency, N=44	29	6 months to 2 years	Control for severity of disease
		11		
Halhuber (1978)	CHD, N=935	94	4 weeks	No control group

TABLE 2.—Continued

Study	Groups	Quit rate (percent)	Duration of followup	Comments ¹
Kirk et al. (1980)	Arterial disease, N=39	49 reported 44 verified	9 months	Objective validation (serum SCN); possible deception rate, 10.5 percent
Kornfeld et al. (1982)	Patients after coronary bypass surgery, N=100 (39 smokers)	67	9 months	No control group
Lloyd and Cawley (1980)	Post-MI, N=105 (64 smokers)	36	4 months	No control group
Mallaghan and Pemberton (1977)	Post-MI, N=321	22	1 year	No control group; differences between ex- smokers for perceived severity and memory of advice
Malotte et al. (1981)	High risk, N=43	53	6 months	No control group; residential program
Mayou et al. (1978)	Post-MI, N=100	45	1 year	No control group
Meyer and Henderson (1974)	Behavior modification, N=5	20	3 months	High risk patients; no significant difference between groups
	Individual counseling, N=4	25		
	Physician counseling, N=6	33		
Ockene et al. (1982b)	High risk group Special intervention, N=4,103 Usual care, N=4,091	40 reported 35 verified 21 reported 19 verified	4 years	MRFTT: objective validation (SCN)

TABLE 2.—Continued

Study	Groups	Quit rate (percent)	Duration of followup	Comments ¹
Powell and Arnold (1982)	High risk, N=42	50 verified	1 year	Objective validation (SCN); hard core smokers
Rahe et al. (1979)	Post-MI Group therapy, N=22 Control, N=22	33 42	4 years	No significant difference
Ronan et al. (1981)	Post-MI, N=117 (111 smokers)	51 reported 47 verified	4 to 18 years	Objective validation (COHb); possible deception rate, 8.8 percent
Rose and Hamilton (1978)	Normal care, N=731 Intervention, N=714	14 36	3 years	High risk for cardiorespiratory disease
Rose et al. (1982)	Normal care, N=731 Intervention, N=714	Not reported 36	9 years	Followup of Rose and Hamilton (1978)
Rose and Udechuku (1971)	Hospitalized with atherosclerotic disease, N=56	44	Not given	No control group
Rose et al. (1980)	High risk, N=736	29	4 years	Part of WHO trial
Sillett et al. (1978)	Post-MI, N=91	65 reported 51 verified	1 year	Objective validation; possible deception rate, 23 percent
Sivarajan et al. (1983)	Post-MI Exercise, N=88 Exercise and counseling, N=86, Control, N=84	31 34 41	6 months	No significant differences
Sparrow et al. (1978)	Post-MI, N=202 smokers	28	Variable 2 to 6 years	Followup of smokers developing MI in the Framingham study; no control group

TABLE 2.—Continued

Study	Groups	Quit rate (percent)	Duration of followup	Comments ¹
Weinblatt et al. (1971)	Post-MI, N=283 Angina, N=146 Non-CHD, N=432	50 50 19	4.5 years	Control for severity of disease
WHO European Collaborative Group (1982)	High risk, N=4,770	6	4 years	No control condition
Wilhelmsson et al. (1975)	Post-MI, N=564	53	3 months	Differences between ex-smokers and smokers for increasing age and severity of disease

¹ Objective validation of self-report of smoking abstinence was performed only in those studies so indicated.

varied from routine to strong. Results have generally been better when stronger advice was delivered (Burling et al. 1982).

For example, in an experimental test of the effect of intense advice on post-MI cessation, Burt et al. (1974) routinely assigned 210 male patients to intense or to routine advice conditions. Abstinence rates were higher in the intense advice condition, 62 versus 27.5 percent. The intense intervention consisted of telling the patient repeatedly—in the critical care unit, during convalescence, and during followup—never to smoke again in his lifetime, plus giving him a pamphlet. However, other attempts to increase cessation rates by using group counseling (Rahe et al. 1979) or exercise with or without counseling (Sivarajan et al. 1983) showed no differences in abstinence rates for treatment groups and control groups.

Fourth, a variety of subject and environmental factors that may influence cessation have rarely been systematically examined or controlled. These include age, sex, race, severity of the MI, and personality and environmental factors. Age is not found to be related to cessation in most studies (e.g., Baile et al. 1982; Croog and Richards 1977; Salonen 1980; Sparrow et al. 1978; Weinblatt et al. 1971). Both of the studies presenting data on sex differences in post-MI cessation have noted somewhat higher cessation rates among males; however, sample sizes were small and the differences were not statistically significant (Baile et al. 1982, Sparrow et al. 1978). Racial data have not been available for nonwhite populations. Greater severity of an MI has been associated with higher smoking cessation rates (Baile et al. 1982, Wilhelmsson et al. 1975). Personality and environmental factors are complex, and only a few relationships have been explored. For example, neither Baile et al. (1982) nor Croog and Richards (1977) found associations with any of the sociodemographic or Health Belief Model variables measured, but Baile et al. (1982) did identify an environmental factor—being offered cigarettes by visitors—that influenced resumption of smoking among hospitalized post-MI patients.

The descriptive study by Baile et al. (1982) provided several suggestions for intervention with post-MI patients—introducing the intervention prior to hospital discharge and as early in the hospitalization as is feasible, even in the critical care unit, and involving family members and visitors in the effort to prevent resumption of smoking. This study was not designed to assess the mechanism by which relapse was negatively associated with severity of the MI, but the authors offered several possibilities: the presence of subjective factors such as specific illness symptoms, general malaise or level of fear, communications from the medical staff regarding severity of heart attack, intense and specific advice to quit smoking, or differential medical treatment that might have affected the patients' smoking behavior. These factors should be considered in the design